

REMARKS

General Remarks

With this Amendment, Applicants cancel Claims 84 and 85 and add new Claims 95-102. No new matter is added. Therefore, Claims 73-83 and 86-102 are all the claims currently pending in the present application.

The Examiner has considered and made of record all documents submitted by Applicants in the Information Disclosure Statement filed on March 22, 2002. The Examiner has also acknowledged Applicants' claim to foreign priority and the receipt of certified copies of the priority documents in the current National Stage Application from the International Bureau.

Drawings. The drawings stand objected to under 37 C.F.R. § 1.83(a) as allegedly failing to depict various features of the present invention as recited in Claims 84 and 85. Applicants submit that, with this Amendment, Claims 84 and 85 are cancelled. Therefore, Applicants respectfully request that the objection to the figures be reconsidered and withdrawn.

Claim Objections. Claims 76 and 93 stand objected to as being of improper dependent form for failing to further limit the subject matter of a previous claim. With this Amendment, Applicants amend Claims 76 and 93. Applicants submit these claims are currently in proper form and respectfully request that the objections thereto be reconsidered and withdrawn.

Claims Rejections.

• Claims 75-77, 79, 80, 82-88, 92, and 94 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly indefinite for failing to particularly point out and distinction claim the subject matter which Applicants regard as the invention.

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- Claims 73, 74, 79, 80, 82, 84, and 88-91 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Bendett et al., U.S. Patent No. 6,636,678 ("Bendett").

- Claims 73, 74, and 85 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Kashyap, U.S. Patent No. 6,104,852 ("Kashyap").

- Claims 73, 82, and 83 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Carlson et al., U.S. Patent No. 4,976,539 ("Carlson").

- Claims 75, 76, 81, 92, and 93 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Bendett.

Applicants respectfully traverse these rejections as discussed below.

Allowable Claims. The Examiner indicates that Claim 78 is objected to as dependent on a rejected base claim, but would be allowable if rewritten into independent form, including all the limitations of the claims from which it depends. Claims 77, 86, 87, and 94 would be allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph, and into independent form, including all the limitations of the claims from which they depend. Applicants submit, as discussed below, that Claims 77, 86, 87, and 94 have been amended to overcome the rejections under §112. However, Applicants respectfully request that the rewriting of Claims 77, 78, 86, 87, and 94 into independent form be held in abeyance until the Examiner has fully considered the following arguments.

§112 Rejections

Regarding the Examiner's §112 rejection of Claims 75-77, 79, 80, 82-88, 92, and 94, Applicants amend these claims, and respectfully request that the §112 rejection thereof be reconsidered and withdrawn.

Claim 73

Amendments to Claim 73. Applicants submit that Claim 73 has been revised to make it clear that the means for causing the partial reflections locates the reflecting locations along the

optical path at distances from the first end along the optical path which are functions of the effective optical length of the optical path, taking account of alterations to the actual length of the optical path resulting from the effect of the means for causing the partial reflections, so that the distances of the reflecting locations along the optical path from the first end are such that the standing waves set up between the first end and each of the reflecting locations, and the standing wave or waves set up between any two of the reflection locations, and the standing waves set up between the first and second ends, are all in harmonic relationship with each other.

It is respectfully submitted that there is a fair basis in the specification for the amendments to Claim 73 at page 9, line 19 through page 10, line 3 and also at page 15, line 30 through page 16, line 25. There is also a fair basis for the revision to Claim 73 in the provisional specification of the priority creating Application, namely, Irish Short-Term Patent Application No. S99/0793, which was filed on September 23, 1999, at page 5, lines 4-14 and at page 18, lines 5-19.

Claim 73 generally. It is respectfully submitted that none of the cited references disclose at least an optical waveguide for outputting light of a substantially single predetermined wavelength which includes such a means for causing the partial reflections which locates the reflecting locations, as discussed above. In particular, it is respectfully submitted that none of the cited references disclose at least an optical waveguide whereby the means for causing the partial reflections locates the reflecting locations along the optical path at distances which are functions of the effective optical length of the optical path, taking account of alterations to the actual length of the optical path resulting from the effect of the means for causing the partial

reflections. It is respectfully submitted that each of the cited references essentially disclose conventional type laser waveguides whereby the means for causing partial reflections, such as gratings, slots or the like are positioned based on the physical length of the optical path, rather than on the effective optical length of the optical path taking account of the alterations to the actual length of the optical path resulting from the effect of the means, such as gratings, slots and the like, which are provided for causing the partial reflections.

Bendett. Regarding the Examiner's §102(e) rejection of Claim 73 over Bendett, Applicants submit that Bendett fails to disclose or suggest each limitation of the present invention as recited in the revised Claim 73. While Bendett does disclose an optical waveguide, there is no disclosure, nor is there any suggestion in Bendett of a waveguide which comprises all the features of the revised Claim 73. In particular, Bendett fails to disclose or suggest at least locating the reflecting locations along the optical path, as recited, at distances from the first end which are functions of the effective optical wavelength of the optical path, *taking account of alterations to the actual length of the optical path resulting from the effect of the means for causing the partial reflections*.

In Bendett, gratings GR are provided along the optical path which define reflecting locations, and Bendett discloses varying the effective DBR spacing of the various gratings GR for facilitating changing the resonant frequency of the laser, and thus, the wavelength of the laser beam. The suggested methods for varying the effective DBR spacing of the various gratings suggested by Bendett are by varying the DBR spacing as fabricated, or by varying the angle of the DBR grating to the waveguide axis. However, it is respectfully submitted that Bendett only

discloses varying the effective DBR spacing of the gratings GR. Bendett fails to disclose any variation of the effective DBR spacing which is a function of the effective optical length of the optical path taking account of alterations to the actual length of the optical path which would have resulted from the effect of the gratings. Thus, it is respectfully submitted that Bendett fails to disclose or suggest that in locating the reflecting locations along the optical path, the distances of the locations are a function of the effective optical length of the optical path taking account of the alteration of the actual length of the optical path resulting from the effect of the means which causes the partial reflections.

Furthermore, it is respectfully submitted that not only does Bendett fail to disclose an optical waveguide with the above-discussed feature, but furthermore, Bendett fails to even suggest the provision of such a feature in an optical waveguide. Accordingly, it is respectfully submitted that Bendett fails to disclose or suggest an optical waveguide with the features recited in revised Claim 73.

Accordingly, it is submitted that whether Bendett is considered separately or combined with other prior art documents, the invention of the revised Claim 73 is novel and not obvious, and Applicants respectfully request that the §102(e) rejection of Claim 73 over Bendett be reconsidered and withdrawn.

Kashyap. Regarding the Examiner's §102(e) rejection of Claim 73 over Kashyap, Applicants submit that Kashyap fails to disclose or suggest each limitation of the present invention as recited in the revised Claim 73.

Applicants submit that Kashyap discloses an optical waveguide which comprises gratings 33 and 34 which are spaced apart with a spatial periodicity which is chosen to produce resonance for signals fed from a laser 40 into the waveguide. However, Kashyap fails to disclose or suggest at least the provision of the means for causing the partial reflections which locates the reflecting locations at distances from the first end along the optical path which are functions of the effective optical length of the optical path, *taking account of alterations to the actual length of the optical path resulting from the effect of the means for causing the partial reflections*. There is no disclosure in Kashyap of the gratings 33 and 34 being so located. Furthermore, Kashyap fails to suggest even the possibility of locating the gratings 33 and 34 to take into account the alteration of the optical length of the optical path caused by the gratings 33 and 34. Clearly, there is no disclosure, nor is there any suggestion of the possibility of locating the gratings 33 and 34 along the optical path to take account of alterations to the actual length of the optical path resulting from the effect of the gratings 33 and 34.

Accordingly, it is submitted that whether Kashyap is considered separately or combined with other prior art documents, the invention of the revised Claim 73 is novel and not obvious, and Applicants respectfully request that the §102(e) rejection of Claim 73 over Kashyap be reconsidered and withdrawn.

Carlson. Regarding the Examiner's §102(b) rejection of Claim 73 over Carlson, Applicants submit that Carlson fails to disclose or suggest each limitation of the present invention as recited in the revised Claim 73.

Applicants submit that Carlson discloses a semiconductor diode laser array which comprises a substrate 12 having first and second opposed surfaces 14 and 15 with a plurality of spaced apart gain sections arranged in line on the first surface 14. DBR waveguides 18 are located at each end of the respective gain sections 16, and separate DBR waveguides extend between each pair of adjacent gain sections 16 so as to optically connect the gain sections 16. The DBR waveguides 18, according to Carlson, serve three functions, one of which is to provide wavelength selective feedback of the light generated in the gain sections 16, which is necessary to support laser oscillation in the gain sections 16. Additionally, Carlson suggests that the grating period of the DBR waveguides 18 should be such that the operating wavelength of the device is on the short wavelength side of the gain peak of the gain section 16, so that the magnitude of the loss modulation and the differential gain of the gain section 16 is maximized. Carlson goes on to state that with the knowledge of the gain spectrum and the waveguide effective index, it is possible to select a specific operating wavelength by appropriate choice of the grating period. However, it is respectfully submitted that nowhere does Carlson disclose the provision of the means for causing the partial reflections for locating the reflecting locations along the optical path at distances from the first end along the optical paths which are functions of the effective optical length of the optical path, *taking account of alterations to the actual length of the optical path resulting from the effect of the means for causing the partial reflections*. Furthermore, it is respectfully submitted that there is no suggestion in the disclosure of Carlson of the possibility of providing an optical waveguide with such a feature.

Accordingly, it is submitted that whether Carlson is considered separately or combined with other prior art documents, the invention of the revised Claim 73 is novel and not obvious, and Applicants respectfully request that the §102(b) rejection of Claim 73 over Carlson be reconsidered and withdrawn.

Other references. In addition to the above, Applicants respectfully submit that none of the other prior art documents, cited but not relied-upon by the Examiner, disclose or suggest an optical waveguide which comprises a means for causing the partial reflections which locates the reflecting locations along the optical path at distances from the first end along the optical path which are functions of the effective optical length of the optical path, taking account of alterations in the actual length of the optical path resulting from the effect of the means for causing the partial reflections. Therefore, whether Komatsu, et al., U.S. Patent No. 5,358,896, Koch, et al., U.S. Patent No. 6,490,044, or any of the other prior art documents are considered separately or combined, it is respectfully submitted that the invention of the revised Claim 73 is novel and not obvious.

Claim 90

Regarding the Examiner's §102(e) rejection of Claim 90 over Bendett, Applicants respectfully submit that Bendett fails to anticipate Claim 90 for at least the reasons discussed above with respect to Claim 73. Therefore, Applicants respectfully request that the §102 rejection of Claim 90 over Bendett be reconsidered and withdrawn.

Claims 74-83, 86-89, and 91-94

Regarding the Examiner's §102 and §103 rejections of dependent claims 74-83, 86-89, and 91-94, Applicants submit that these claims are patentable at least by virtue of their

dependence on Claims 73 and 90 and respectfully request that the rejections thereof be reconsidered and withdrawn.

New Claims 95-102

With this Amendment, Applicants add new Claims 95-102 in order more fully to cover various aspects of Applicants' invention as disclosed in the specification.

Claim 95 includes some deleted features of Claim 76. Claims 96-98 include some deleted features of Claim 80. Claim 99 includes some deleted features of Claim 81. Claim 100 includes some deleted features of Claim 82. Claim 101 includes some deleted features of Claim 86. Claim 102 includes some deleted features of Claim 93.

Applicants respectfully submit that new Claims 95-102 are patentable over the cited references at least by virtue of their dependence on Claims 73 and 90.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/088,758

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Respectfully submitted,



Laura Moskowitz
Registration No. 55,470

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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